Visual Simulation as a Tool for Interpretation

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Cultural landscapes are special physical settings which reveal aspects of a place's origins and development, its culture, and use. A cultural landscape encompasses a much broader scope than aesthetics to include the social and ecological significance of the place, past beliefs, technology, and attitudes toward nature. It is because of this broader scope that interpreting the history of a landscape can be somewhat intimidating. However, there is a variety of techniques which can be employed to effectively communicate both existing and non-existing landscape features.

This article addresses the use of computer-generated visual simulations as a tool for cultural landscape treatment and interpretation. In particular, the use of visual simulation to visualize the reconstruction of a cultural landscape is discussed as a means of enhancing the public's understanding of the landscape's history.

Through the medium of computer simulation, a set of photorealistic visual reconstructions can be prepared depicting the landscape during significant periods of its development. These simulations can then be referenced and interpreted (indoors, hand held, discrete signage, etc.). Visitors can be instructed to stop at designated locations to view the existing situation and, simultaneously, to look at simulations of the same views. The key to the success of this process is the selection of important views—fortunately, these are often part of the historic record.

Benefits of Visual Simulation

Computer-generated visual simulations are a powerful tool for the treatment and interpretation of cultural landscapes. Specifically, the benefits of using photorealistic computer-generated visual simulations in landscape preservation efforts are:

Evaluating and Determining Treatment of a Landscape. Visualization of specific treatments, such as the removal of inappropriate additions and restoration and reconstruction of selected character-defining features, can assist in determining the appropriateness of an action prior to implementation. Additionally, planning and design controls for adjacent lands, maintenance, and security issues can be evaluated through simulations.

Visual Contract of Proposed Action. A series of visual simulation records can be used as contractual documents for treatment actions or to guide project implementation.

Support for Funding and Consensus Building Tool. The use of the simulations can assist decision makers and constituent groups in building consensus and garnering political and financial support for a project.

Understand the Landscape Chronology and Continuum—How did we Get to Here? Simulations installed in the landscape itself may be used to depict how the property has changed over time, in addition to, or in lieu of, physical intervention.

Visual Simulation As a Tool for Landscape Reconstruction

The use of visual simulation to illustrate a landscape reconstruction involves "editing" a contemporary viewshed to reveal its historic or past visibilia. It is the visual editing of an image, not an actual physical reconstruction. The term "viewshed" is defined as a selected area of the cultural landscape visible from a given viewpoint. Visibilia are the physical elements seen, related to the landscape's origins and development, which contain a visible record of human activity rooted in the use of the place.

When a landscape is seen through a series of identical viewsheds, our cognitive connection to its specific physical elements is strengthened. Through careful visual reconstruction of images, selected on the basis of historic research, it is possible to portray the same landscape at a different period of culture and human activity. This process assists in uncovering the living memory of the place—the continuum of experience through time. Exhibits using visual simulation for landscape reconstruction help a visitor to interpret information about the landscape's origin, development, and context—thus making this information more accessible.

Case Study: Olympian Cultural Landscape

A demonstration project at the Temple of the Olympian Zeus site adjacent to the Acropolis illustrates how visual simulations can be used in the interpretation of cultural landscapes. Through visual simulation the landscape has been visually reconstructed to portray its character during three historic periods.

The selected view in figure 1 is from the northeastern side of the Acropolis. Views from this particular location are often photographed by visitors because they offer good vantage points of the Temple of the Olympian Zeus, its relation to the Acropolis and the modern city, and the city's expansion up the slopes of Mount Hymettus. The Temple site extends between the Acropolis and the Illisos River to the southeast. The ancient river bed has been enclosed and paved over to serve as a major transportation artery and sewer line. This area, together with the Acropolis, was part of Athens before the time of Theseus. The land adjacent to the river had lush vegetation and an abundance of fresh water from the Kalliroe Springs. Several important sanctuaries were built in the area, including the Olympian, the Pytheion, and the sanctuary of Aphrodite.

The Temple of Olympian Zeus began as an enormous Doric statue in 515 B.C. by the tyrant Peisistratos, and was completed in the second century A.D. by the Roman emperor Hadrian. In its final form, the Temple was in the Corinthian order with a double column peri-

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style, and was surrounded by a large rectangular space. The Temple was much taller and larger than the Parthenon.

Constructing the Simulations

A three-dimensional wire frame model, assembled in the computer software program AutoCAD, was inserted into the scanned image of the selected view. Next, the composite image was rendered using paint software to visually reconstruct the Temple and its setting, ensuring compatibility with color, light, shadows, and texture. Beginning with the existing landscape, two historic periods were simulated, one from 408-565 A.D. and the other from 1870 A.D. Each image was edited based on historic research of written and visual records, including extant literary descriptions, archeological resources, as well as contemporary folklore.

The 1870 A.D. image shows the compact urban settlement extending out from the Acropolis, and the use of the landscape by its inhabitants. This area served as the gateway to the city. Through successive cutting of trees, sparse vegetation had remained. The landscape was used for agriculture and pasture. Its significance was of little interest to the inhabitants of the new capital of Greece after their liberation from Ottoman rule.

The 408-565 A.D. Imperial Roman image was chosen based on available information and illustrates the spatial configuration of Athens and its environs. The simulation depicts a visual reconstruction of the cultural landscape as it would have appeared during this period based on the available physical and archival documentation. Conjecture is minimized excluding features that are not substantiated by the limited archival material for this period. As illustrated in figure 6, the Illisos River was free-flowing, flanked by lush bottom lands with plane trees, fruit trees, cypress, and pines.

Case Study: Elmhurst Estate, Perintown, OH

The Elmhurst garden site is located just outside of Cincinnati, OH. Recently, much interest has been generated regarding the site because it was the first of three known American commissions of Gertrude Jekyll. Ms. Jekyll was commissioned in 1914 by the owner of the estate, Grace Groesbeck, to prepare a design for an elaborate garden on a wooded site with a steep terrain. Jekyll designed the garden without visiting the site, and it is believed that it was not implemented because of the steepness of the terrain. Mrs. Groesbeck eventually constructed an estate building and a garden at a different location, using several of the garden design elements from the Jekyll plans.

To enrich the interpretation of the site today for garden enthusiasts, and to protect the integrity of the landscape that was constructed by Mrs. Groesbeck, visual simulations can be used to construct the Jekyll garden and compare it to the site today.

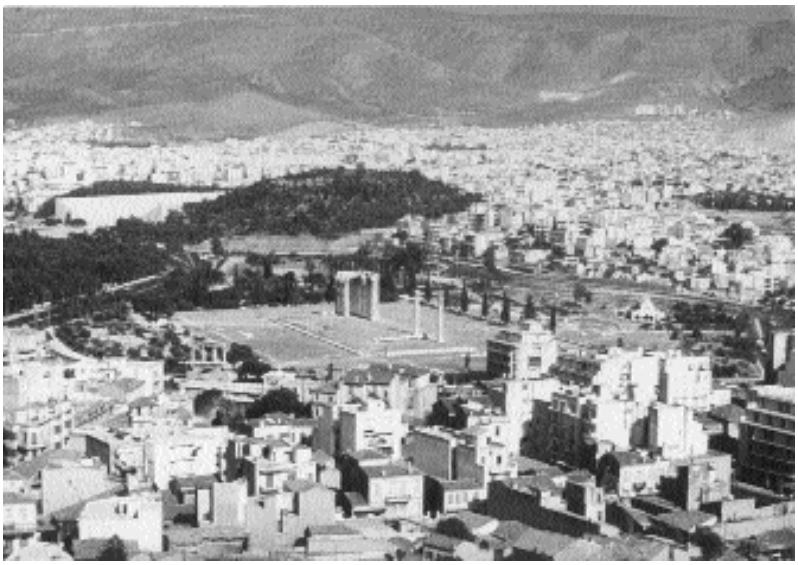

Fig. 1. View for visual reconstruction taken from the northeastern side of the Acropolis. Photo by author.

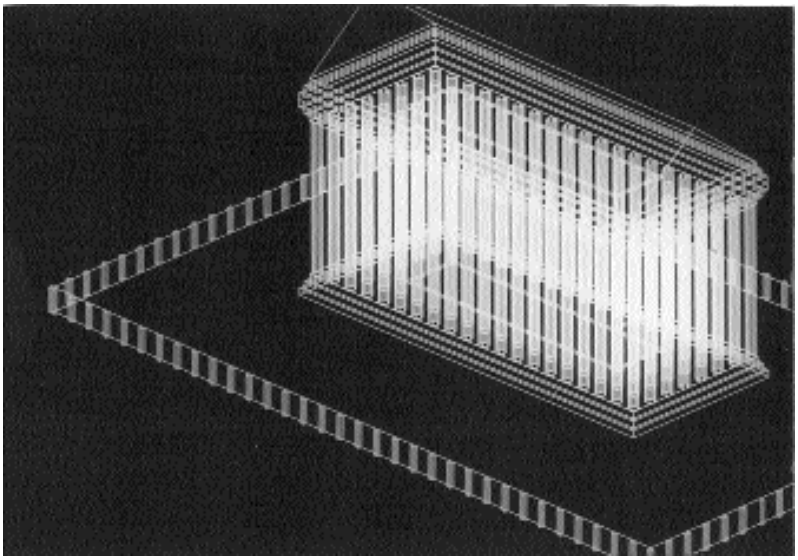

Fig. 2. Wire frame model of the Olympian Zeus temple generated on AutoCad. Photo by author.

Fig. 3. Composite image overlaying wire frame model of the temple on the image. Photo by author.

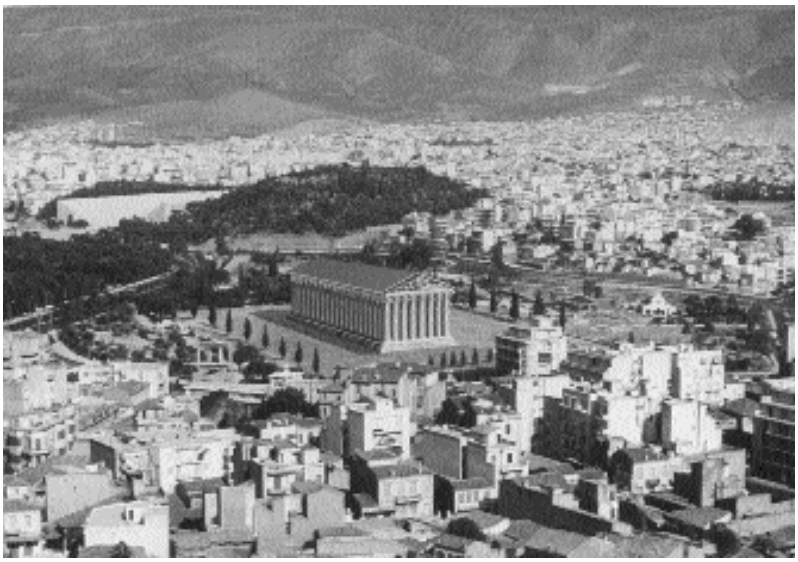

Fig. 4. Temple is rendered with compatible color, light, shadows and texture. Photo by author.

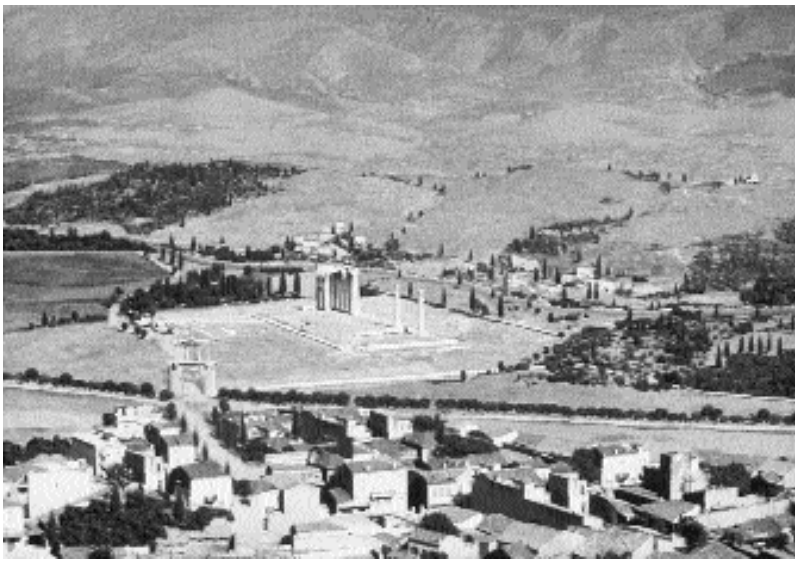

Fig. 5. Visual reconstruction ca. 1870 A.D. with compact urban settlement. Photo by author.

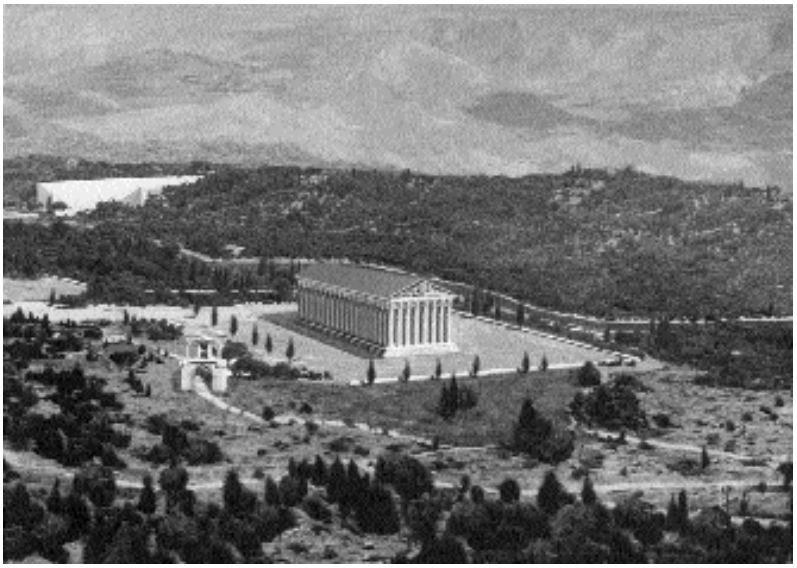

Fig. 6. Visual reconstruction ca. 1870 A.D., based on available documentation with the Illisos River free flowing and lush foreground landscape. Photo by author

Conclusions

Computer-generated visual simulations can play a very important role in cultural landscape interpretation. Simulations can depict landscape reconstructions or, in the case of designs not implemented, constructions, and, as such, assist visitors in understanding the evolution and existing historic features of a landscape. Beyond interpretation, the use and application of visual simulations is being expanded and it appears evident that there it can be a useful tool for professionals involved in preservation planning and treatment. Archeologists, historians, paleobotanists, historical architects, historical landscape architects, etc., can assist in providing the necessary historic research and existing conditions inventory information for composing the simulations, along with using the simulations to analyze the history of a site, evaluate proposed physical interventions.

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